normal blood appeared to have amounts of vitamin B_{12} too low to permit direct assay in the presence of free methionine, and for such materials the *Euglena* assay is recommended. It was found necessary to release bound vitamin B_{12} from tissues, blood serum, etc., by heat or enzyme treatments prior to performing the assays (*4, 10*). In situations where methionine interference can be avoided, as in the determination of potency of vitamin concentrates, etc., this bacterial method may have considerable value because of its simplicity and the short time required for making the determinations.

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The Reversible Depolymerization of Fibrin

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In a previous article the author has shown that a gel formed by the action of thrombin upon purified fibrinogen can be dissolved in 6 *M* urea or 3 *M* guanidine hydrochloride to give a product of the same molecular weight as native fibrinogen under the same circumstances (*1*). A similar result has been obtained by Ferry and Shulman and by Mihalyi (*2, 3*).

Upon dialyzing off the urea against buffer, a gel is regained. It was thought desirable to ascertain whether the fine structure of the gel so produced was equivalent to that of a native fibrin gel. Electron microscopy was employed for this purpose.

A novel technique was utilized for preparing the specimens. A drop of Formvar was spread upon a thin trough of water and the resultant thin film scooped off upon a glass microscope slide. A drop of fibrin in 6 *M* urea was spread evenly over the film, and the latter refloated upon borate buffer-KCl of pH 8.0 and ionic strength .40. The urea quickly dialyzed through the Formvar film, and the gel reformed. The film plus a thin layer of gel was deposited upon wire mesh screens in the usual manner.

The specimen was then dried, washed, and shadowed with gold. The microphotographs obtained under these conditions showed a general resemblance to the published pictures of native fibrin gels under the same conditions (*4*). A network of strands was clearly formed, as is shown in Fig. 1.

[1] The author wishes to acknowledge helpful discussions with K. Laki and George Rozsa, of the National Institutes of Health.

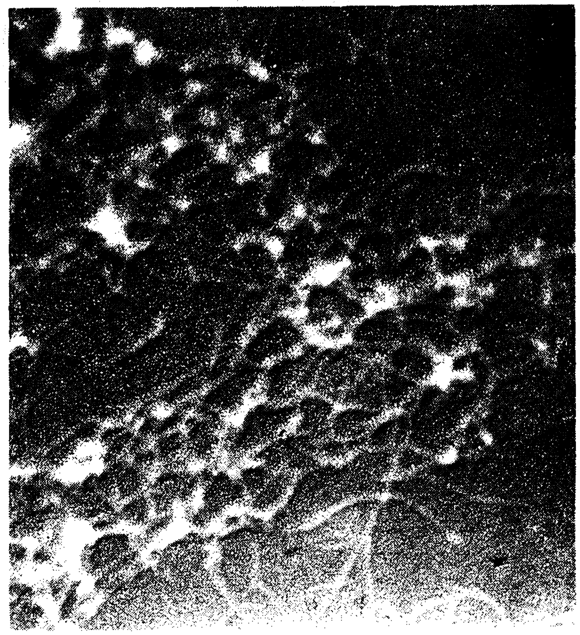

FIG. 1. Gold-shadowed regenerated fibrin clot, pH 8.0, P = .40. × 12,000.

In this manner further evidence is obtained as to the reversibility of the breakdown of fibrin in 6 *M* urea. The depolymerized material is capable of spontaneously reforming a network upon removal of the dispersing agent. It is to this depolymerized material that we may perhaps give the title "profibrin" (*5, 6*).

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The Wave-Frequency Dependence of the Duration of Radar-Type Echoes from Meteor Trails

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A brief discussion of the dependence of the duration of meteor echoes on wave frequency has been given by Lovell (*1, 2*), who concludes that the evidence shows that the duration is approximately proportional to the square of the wavelength. Data collected by the Central Radio Propagation Laboratory of the National Bureau of Standards, consisting of simultaneous measurements of duration at 27.2 Mc and 41.0 Mc, lend support to this conclusion, and in view of its fundamental importance to the theory of meteoric echoes we feel that the evidence should be presented in some detail.

A long series of simultaneous records of meteor echoes at 27.2 Mc and 41.0 Mc was obtained between November 1, 1948, and October 1, 1949. The peak radiated power (approximately 8 kw), pulse width (approximately 40 μsec), antenna pattern (that of a horizontal half-wave dipole one-quarter wave above-ground), and receiver-recorder sensitivity (approximately 5 μv at the input of the receiver) were approximately the same at both frequencies and were kept as nearly constant as possible throughout the period over which the measurements were made. The work was done at the NBS radio field station at Sterling, Va., about 30 miles west of Washington, D. C.

Two methods of recording the echoes were used. One method employed recording milliammeters; the other, conventional range-time photographic recording. On the first type of record, which was used primarily for obtaining meteor rates, time resolution was insufficient for measurement of durations less than about 15 sec. Time resolution on the range-time record was sufficient for measurement of durations as short as 0.5 sec. The second method was used only during June 1949. The series was interrupted during the Geminid shower in December 1948, the delta-Aquarid shower in July 1949, and the Perseid shower in August 1949, when the equipment was used for other observations.

In Fig. 1 the duration at 41.0 Mc is plotted against the duration at 27.2 Mc for approximately 150 different meteors. Points corresponding to durations less than about 15 sec at either frequency were nearly all obtained from range-time records, and the remainder were nearly all obtained from the milliammeter tapes. A straight line of unit slope was fitted visually to the points. It corresponds to a ratio of 27.2 Mc to 41.0 Mc durations of almost exactly 2:1.

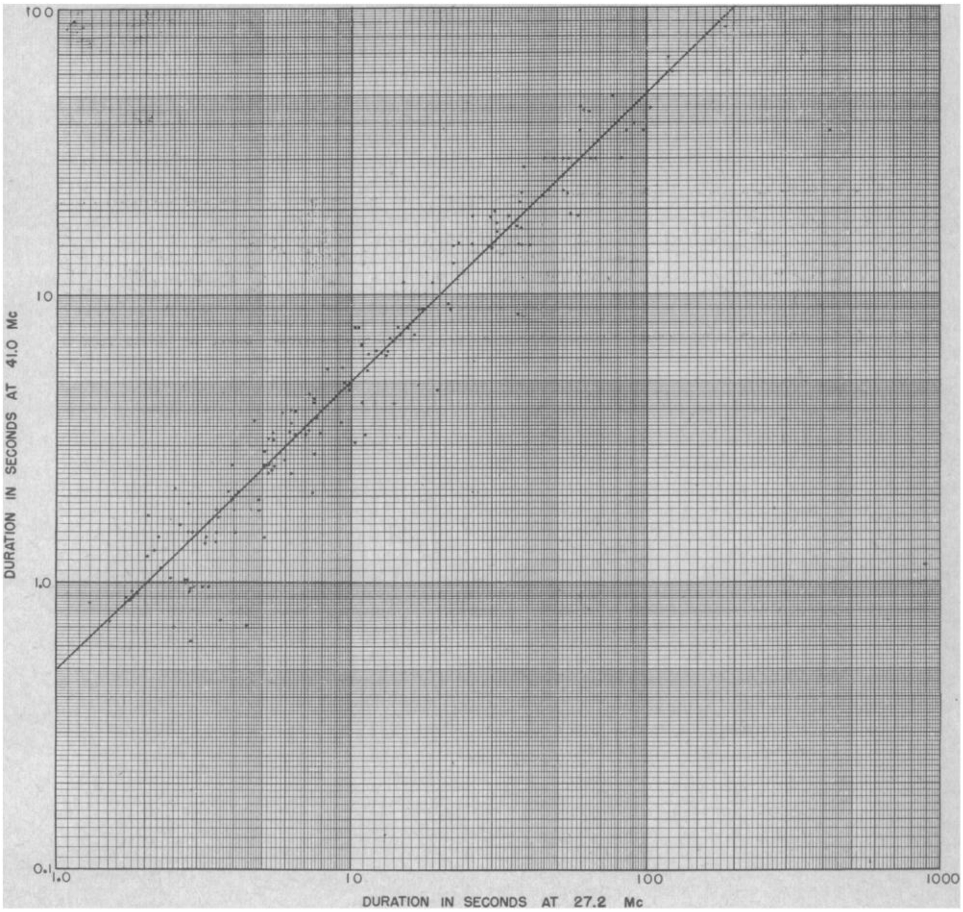

FIG. 1. Duration of meteor reflections at 41.0 Mc vs duration at 27.2 Mc.

An analysis of echoes recorded simultaneously with visual observations of meteors during the delta-Aquarid and Perseid showers of 1949, for which it was possible to estimate (to within $\pm 10°$) the angle of incidence of the radio wave at the meteor trail, showed that the ratio of durations was substantially independent of this angle. Values of the ratio for 28 meteors for which the duration at 27.2 Mc was greater than 4 sec are plotted in Fig. 2 as a function of the angle between the midpoint of the meteor trail and

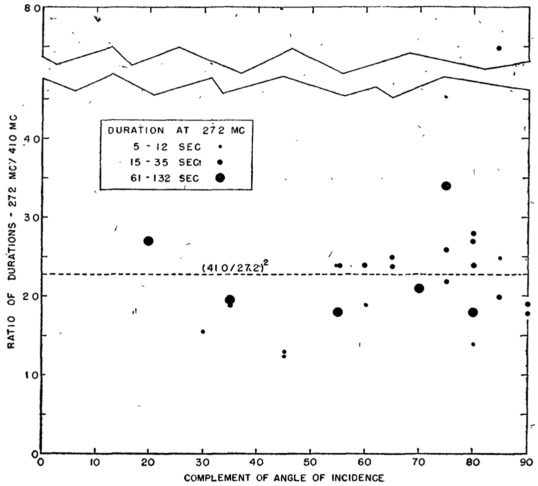

FIG. 2. Ratio of durations as a function of angle of incidence.

the shower radiant (complement of the angle of incidence). Correction for delay in the beginning of the echo (*3*) was made by reckoning duration from the time of visual appearance of the meteor. The time of visual appearance was recorded directly on the range-time record by the observer, who pressed an electric button switch each time a meteor was observed. An allowance of ½ sec was made for the observer's reaction time.

The median ratio in Fig. 2 is 2.3 ± 0.1, which is equal to the square of the ratio of wavelengths (2.27) within the probable error. During the shower observations, the powers and sensitivities were changed somewhat from the values used while obtaining the data in Fig. 1. The difference between the ratios in Fig. 1 and 2 is probably attributable to this.

As pointed out by Herlofson (*4*), simple diffusion of the ionization in a meteor trail, after the ionization has been dispersed so much that the incident radio wave intensity is not appreciably modified in passing through the trail, would result in a reduction of the echo amplitude in accordance with the formula

$$A = A_0 \exp\,(-16\pi^2 Dt/\lambda^2),$$

where A is the amplitude at time t, A_0 is the amplitude extrapolated to zero time, D is the diffusion coefficient for diffusion parallel to the direction of propagation of the radio wave, and λ is the radio wavelength. This formula holds true for any distribution of ionization density upon which diffusion alone is acting, subject to the condition that the incident wave is not appreciably modified in passing through. Thus, as noted by Herlofson, for a constant value of A_0 (approximately realized if power and sensitivity remain constant) the duration would be proportional to λ^2. On the average, the ratios of durations at 27.2 Mc and 41.0 Mc are in good agreement with this relation.

To account for long-enduring echoes, Herlofson suggested that abnormally low values of D would occur for the case of wave propagation nearly transverse to the earth's magnetic field if the transverse diffusion were markedly inhibited. Evidence for such an effect has been cited by Lovell (*1*). Because of the antennas used, our equipment was not well suited to record echoes from meteor trails for which the direction of wave propagation was nearly perpendicular to the earth's magnetic field; nevertheless, many long-enduring echoes were recorded. In Fig. 2 there are six examples of durations at 27 Mc which exceeded 1 min. In these cases the angle between the direction of wave propagation and the direction of the magnetic field, estimated from the visual observations, ranged from 20° to 50°. At these angles the inhibiting effect of the magnetic field would be small. Although this does not constitute evidence that the magnetic field effect does not exist, it shows that the effect is not necessary for the occurrence of echoes of substantial duration.

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Demineralization of Hard Tissues

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If calcium carbonate, basic component of certain hard tissues, is dissolved by the action of an acid reagent, the developing CO_2 bubbles are apt to destroy the pattern of the remaining organic material. Presented with the problem of how to avoid this inconvenience, one of us (H.) suggested an alkaline reagent to be used for the purpose, namely, a solution of the sodium salt of ethylene-diamine-tetracetic acid, whose interesting analytical application he has been studying for some two years (*1, 2*).

Because of the communication by Sreebny and Nikiforuk (*3*), we wish to make known our first observations, which, although incomplete, are very satisfactory.

The equation given by Sreebny and Nikiforuk leaves out of account the hydrolysis of the sodium salt or, more exactly, of the quaternary ion of the acid (represented by R^{----}).

$$R^{----} + H_2O \quad RH^{---} + OH^-.$$

So, one of the possible formulations of the complex-forming reaction of the Ca^{++} ion is correctly[1]

$$RH^{---} + OH^- + Ca^{++} \quad RCa^{--} + H_2O.$$

This elimination of OH^- ions is the phenomenon used in one of the analytical applications of the reagent. In the demineralization process, due to the same phenomenon, an efficient buffer has to be used

[1] For a complete account of the equilibria between all combining ions, see (*4*).